MEDIA LITERACY

Reading on the Internet: The link between literacy and technology

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A girl I'll call Alicia is a whiz on the Internet. She knows how to effectively use a search engine to locate information. She uses links, headings, graphics, and video and audio clips to help her gather information. When reading on the Internet, Alicia believes that the Web will meet her needs. She can usually find the information she seeks, and if for some reason she cannot find the needed information she blames herself rather than the technology. When asked if she ever looks for something on the Internet and does not find it, Alicia replies, "That's the thing. Usually you spell it wrong or you are not searching for the right thing." Alicia is growing up reading the Internet as a source of information.

Jake (all student names are pseudonyms) uses the Internet regularly at school. Unlike Alicia, Jake is a little more skeptical about the truthfulness of information found there, and he often relies upon a book to confirm information found on the Internet. Even though he prefers books, Jake can effectively use the Internet, and he applies the same reading strategies he uses in print reading. When asked to describe his Internet reading strategies, Jake talks of reading the first sentence in a paragraph because that is the topic sentence, which tells about the paragraph. If Jake decides the topic sentence will help him find information he needs then he will continue reading the remainder of the paragraph, much like he would do if reading print text. Jake is applying what he knows about reading print text to reading Internet text.

These descriptions of adolescent Internet readers become even more complete when we study how the Internet is used by adolescents. Alicia and Jake have access to the Internet at home, as do 47.9% of all 12- to 17-year-olds in the United States (U.S. Census Bureau, 2001). They also attend school in classrooms that are among the 98% of K–12 classrooms that have access to the Internet (Cattagini & Farris, 2001). Alicia and Jake represent an equal number of boys and girls who use the Internet (U.S. Census Bureau, 2001). For Alicia, the Internet is the tool of choice when searching for information. Using the Internet this way or to complete school research makes up 30.7% of children's Internet use, with e-mail being the next most common use at 22.2% (U.S. Census Bureau, 2001). Like Alicia and Jake, many of today's students have instant access to information.

The union of reading and technology on the Internet is causing educators to take a new look at

what it means to be literate in today's society (Leu, 2002). New forms of literacy call upon students to know how to read and write not only in the print world but also in the digital world. Today's definition of *literacy* is being broadened to include "literacy skills necessary for individuals, groups, and societies to access the best information in the shortest time to identify and solve the most important problems and then communicate this information" (Leu, 2000, p. 476). The Internet has provided the world of work with global competition and an informational economy (Leu, 2000). Knowing how to access, evaluate, and apply information is necessary for success in the workplace and at school.

Being able to successfully use the Internet places special demands on the reader (Kamil & Lane, 1998). First, the Internet reader must be able to handle the sheer volume of text, which can be described as massive. The potential for gathering information is virtually unlimited. Through links, or Internet connections, a reader can access innumerable sites related to the original idea or topic of a search. Second, much Internet content has blinking graphics, vivid color, and lots of eye-catching phrases that can guide or distract from the reading. A reader must be able to evaluate all the features of a webpage and quickly decide which one will likely be the most helpful in accessing information.

Third, most of the text on the Internet is expository. Being able to read such text requires familiarity with its concepts, vocabulary, and organizational format. In an analysis of 50 websites, 48 contained expository text, while 2 sites contained narrative text (Kamil & Lane, 1998). Expository text is usually found on the Internet written as hypertext where highlighted elements within it, such as a word or phrase, are linked to other texts. Each link can lead to a definition, additional information, or a video or audio example related to the original linked word or phrase.

By selecting links in various orders, a reader creates his or her own path when reading on the Internet. This path can be ever changing because information on the Internet is ever changing, with websites continually being updated, removed, or remodeled. Text on the Internet is not static whereas the text of a book remains the same each time the book is opened. The Internet is "an interactive model of continuously updating information" (Gilster, 1997, p. 135), which requires a rethinking of what it means to be a reader or even a literate person. Because of technology, our definition of *reading* has changed to include websites, e-books, e-mail, discussion boards, chat rooms, instant messaging, and listservs.

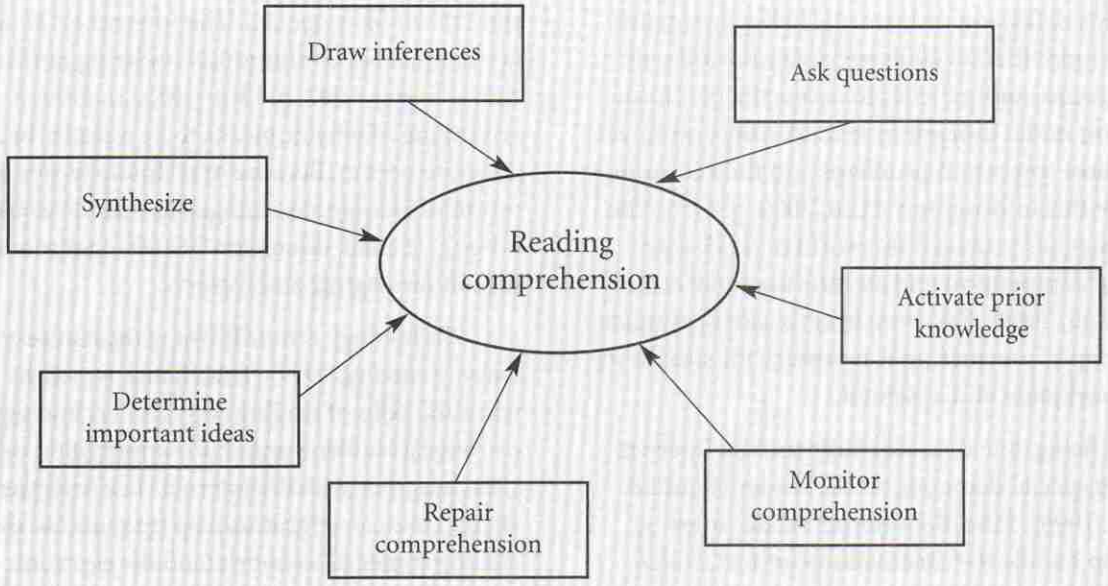
Technology is transforming the nature of literacy (Reinking, 1998). This change is evident when the skills of reading and using technology converge as students search for information or answer questions with the Internet (Leu & Kinzer, 2000). How can educators help students use their reading strategies to understand the electronic word? Many literacy educators are currently watching the convergence of literacy and technology, and they are seeking answers to this very question.

Strategic readers of print text

One answer is to begin with what we know about strategic readers of print text: They tend to use a set of comprehension strategies (Dole, Duffy, Roehler, & Pearson, 1991; Pearson, 1985). Research has focused on identification and instruction of such strategies because poor readers seem to lack them and to be unaware of when and how to apply the knowledge they do possess. (See Pressley & Afflerbach, 1995, and Block & Pressley, 2001, for reviews of much of the research on good readers' comprehension.) Paris, Cross, and Lipson (1984) concluded that students can be taught about the existence of reading strategies through informed direct instruction. Duke and Pearson (2002) suggested that a model of comprehension instruction should include explicit description, modeling, collaborative use, guided practice, and independent use of the selected strategy.

Pearson, Roehler, Dole, and Duffy (1992) developed a comprehensive synopsis of strategic

Figure 1
Seven comprehension strategies for reading comprehension



Activate prior knowledge—Strategic readers use what is known about the topic of a text and the way a text is organized to check their comprehension and make mental connections between new information and existing knowledge.

Monitor comprehension—Reading rate and strategies are adjusted when a reader needs to understand different kinds of text.

Repair comprehension—When meaning has been lost, fix-up strategies, such as rereading and skipping ahead, are used by strategic readers to move reading back on track.

Determine important ideas—Making predictions and identifying the most important ideas of the text come before, during, and after reading.

Synthesize—Throughout reading, strategic readers mentally summarize information as a way to check their comprehension.

Draw inferences—Strategic readers combine prior knowledge with textual information to make inferences about the text. Gaps in understanding are filled in through predictions, inferences, and new ideas.

Ask questions—Questions are developed and answered by strategic readers throughout the reading of the text to activate prior knowledge, check comprehension, clarify ideas, and focus attention.

reader research organized around seven comprehension strategies that consistently surface in research about strategic readers (Figure 1). These strategies are described as a comprehension curriculum and form the basis for a model of the process of reading comprehension.

Pearson et al. (1992) found these seven components of comprehension to be the factors that distinguish between expert and novice readers—between skilled and less able readers. Recent uses of this model focused on the teaching of strategies in context (Dowhower, 1999) and

teaching them in collections or packages as a way to help students develop better comprehension (Duke & Pearson, 2002).

Connections between literacy and technology

Literacy and technology converge when students read on the Internet. The skills required to comprehend text (expository text in particular) are used when students search the Internet for an answer to a question or just browse from website to website. To be adept at seeking, evaluating, and using information found on the Internet, readers must navigate through Internet text and apply their knowledge of the reading process. The merging of these skills is seen when the Internet reader performs a reading act, such as searching the Internet for information about snowboarding.

How do the reading strategies identified in the comprehension model (Pearson et al., 1992) look when applied to Internet text? Internet readers are reading expository text in a hypertext format where ideas are connected by links, headings, icons, and graphics. Yet, Internet reading appears to apply similar reading strategies as those used with print text reading. Figure 2 describes the reading strategies identified in the comprehension model and compares how these strategies are used when reading on the Internet. An additional strategy (navigate) has been added to the model to describe the skills needed by the Internet reader to not only make meaning from text but to also be able to locate the information within an Internet text.

Strategic readers of Internet text

Observations and interviews with adolescent Internet readers provide examples of the comprehension strategies these readers apply to the reading of Internet text. The students completed an Internet search task by locating the answer to a question based on a topic in their science or social studies curriculum. Through their own words, these readers share how they applied comprehension strategies to Internet reading.

Activate prior knowledge. When searching on the Internet for information about the rights of free blacks following the U.S. Civil War, Breann was able to draw upon her prior knowledge from social studies class and other readings she did outside of class. Breann said,

> Well, I looked for key points again, like Civil War, and blacks, and free, and problems, like that. And then I didn't see that, so I had to kind of think about what I learned to help get ideas to type in the search box.

Breann activates and reactivates her prior knowledge in her attempts to locate the necessary information.

Monitor comprehension. Mike searched the Internet for information about static electricity. When encountering a webpage, Mike first reads it by skimming for a specific piece of information. When he sees a word or phrase that might be a clue to the information he seeks, he returns to the webpage and reads more carefully, paying closer attention to the details. Mike said, "I read the orange part [headings]. I'm going to read the black part [description] now." Mike moves from big ideas to small details, always with a focus on efficiency and speed when reading on the Internet.

Repair comprehension. Allison is a slow and careful reader. Her initial reading of a webpage might be a quick one, with slightly more time spent than she would spend skimming the page. If her quick reading shows the webpage may contain the answer to her question, she reads the entire page more carefully and then returns to reread specific sections that might have the required information. Each reread follows the curve of a spiral, moving ever closer to the center and the answer to her search question.

Determine important ideas. Jake plans his Internet reading around a keyword identified

Figure 2
Comparison of reading strategies

	Book	Internet
Activate prior knowledge	Reader recalls experiences and information relating to the topic.	Similar strategies used.
Monitor and Repair comprehension	Reader adjust reading rate depending on the purpose of reading.	Skimming and scanning becomes crucial for reading sheer volume of text.
Determine important ideas	Reader analyzes text to determine which parts are important for developing an understanding of text.	Similar strategies used.
Synthesize	Reader sifts important from unimportant details to determine the kernel of an idea.	Similar strategies used.
Draw inferences	Reader reads between the lines, using background knowledge and text to help fill in the gaps.	Similar strategies used.
Ask questions	Questions give purpose to reading by motivating the reader to continue.	Guiding question must be in forefront of reader's mind or getting lost or sidetracked is likely.
Navigate	Reader uses the feature of print text to search for information (e.g., table of contents, glossary, headings).	Reader figures out features of the Internet in order to search for information (e.g., pop-up ads, downloading).

from a question about Thomas Edison's invention of the telegraph. This keyword guides Jake's choices of sites to visit, the details to attend to or not attend to at each site, and when to skim or read more carefully. Jake said, "I am looking for the answer to my question, one [word] that sounds like it'll answer it." To Jake, the keyword is pivotal to forming a mental plan for his Internet search.

Synthesize. Kelsey pauses during her Internet reading to summarize what she has read about the U.S. 15th Constitutional Amendment and put the somewhat difficult language from the amendment into her own words: "That no one should be race, color, or anything, like...they... yeah. Like, they can vote and no one will tell them that they can't...like, they can do what everyone else can." Kelsey seems to confirm her own understanding by orally pulling together the ideas from the text she has read on the Internet.

Draw inferences. Mike makes an inference when reading on the Internet by determining that a website he is reading is not going to help him find his information: "This isn't it. This is a classroom, schoolhouse site. So this isn't the right place for me to search. It's talking about like, the staff phone book, so I don't think this is the right place for me." Mike skims the site and quickly draws the conclusion that he needs to move on to another one.

Ask questions. Kelsey questions herself during reading as a way to check her understanding of information about the U.S. post–Civil War era found at the website http://odur.let.rug.nl/~usa/H/1994/ch6_p13.htm. She wonders aloud if the information is what she needs to answer her question: "Would this be a part of it? 'Many southern whites, their social dominance threatened, turned to illegal means to prevents blacks from gaining equality.'" By self-questioning, Kelsey can check her understanding and make connections.

Connecting literacy and technology

These Internet readers have taken the strategies used for reading print text and applied them to the reading of Internet text. Along with knowing how to navigate the Internet, they also know how to read it through use of their prior knowledge about the topic and the structure of the text. The present and future use of the Internet for these students relies on speed, efficiency, and understanding of how to make it an effective tool in their world of work and learning. Educators can guide students to be successful Internet readers by helping them recognize their experiences with various types of text and applying this knowledge to Internet reading. Literacy and technology are converging in classrooms where teachers provide opportunities for students to gain information from reading on the Internet. Through modeling and instruction, teachers can begin to build the bridge connecting literacy and technology.

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